

The effect of Parkinson's disease and subthalamic deep brain stimulation on executive and memory functions

Gyula Demeter (1, 2), Péter Pajkossy (1, 2), Ágnes Szöllősi (1), Ágnes Lukács (1), István Valálik (3), & Mihály Racsomány (1, 2)

(1) Department of Cognitive Science, Budapest University of Technology and Economics, Budapest, Hungary

(2) Research Group on Frontostriatal Disorders, Hungarian Academy of Sciences, Budapest, Hungary

(3) Department of Neurosurgery, St. John's Hospital, Budapest, Hungary

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Abstract

Objectives:

The aim of the present study was to assess the effect of bilateral deep brain stimulation (DBS) of the subthalamic nucleus (STN) on executive and memory functions in PD patients using an unstimulated PD control group matched on motor symptoms, medication and DBS indication.

Method:

Thirteen PD patients with DBS implantation (DBS group) and 15 PD wait-listed patients (control group) participated in the study. A neuropsychological battery was used to assess cognitive functions. Each task was administered twice: before and after surgery in the DBS group with the stimulators on and with a similar time interval between the two task-administration points in the control group.

Results:

There was no significant difference between the DBS and the control groups' performance in tasks measuring short-term and working memory and main executive functions. The DBS group showed a significant decline on the semantic verbal fluency task after surgery compared to its own baseline level ($p < .05$). Additionally, the DBS group showed a decreased execution cost score at the second assessment point of the prospective memory task, compared to the control group ($p < .05$).

Conclusions:

Our results provide support for the cognitive safety of the STN DBS using a wait-listed PD control group. The DBS group showed impaired performance after the surgery only on the semantic verbal fluency task which is in line with findings of previous studies. Furthermore, to the best of our knowledge, this is the first study to show that DBS of the STN boosts prospective memory, in particular intention execution functions.

Keywords: Parkinson disease, deep brain stimulation, executive functions, memory